

**Abstract**

Systems and methods of optimizing communication channels in multi-user communication systems are provided. Coding weights are determined based on communication channel state information for communication channels between a transmitter and multiple receivers. The coding weights are applied to communication signals to be transmitted from the transmitter to the receivers. Each receiver decodes received signals using inverses of the coding weights. Embodiments of the invention support multi-user MIMO (Multiple Input Multiple Output) where each receiver has fewer antennas than the transmitter, and enhance system performance if the total number of antennas at all of the receivers exceeds the number of antennas at the transmitter.